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**THE EFFECT OF INSTRUCTION ON SHORT AND LONG TERM
MEMORY OF SONGS AND THEIR MUSICAL ELEMENTS**

By

ALANNA CAMPBELL
B.A. in Ed (Primary)

A Thesis Submitted in Partial Fulfilment for the Requirements for the Award of

Bachelor of Education with Honours

at the Faculty of Education, Edith Cowan University

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USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

ABSTRACT

This research project investigated the extent to which two methods of instruction enhance memory (short and long term) and transfer of the knowledge into various contexts of songs and their musical elements. The two methods of instruction investigated were the rote memorisation and the whole method. Students of one year three class from a metropolitan, co-educational government school were the participants in the research.

The students served as both the control and experimental groups. They were taught four songs over a course of eight weeks by the school's music specialist. The eight weeks were divided into two four week sessions. Two simple and repetitive songs were taught in the first four week session - one using the rote memorisation method of instruction and the other using the whole approach. Two more difficult songs were taught in the second four week session using the same two methods. Immediately after each session the students were tested (Test 1) to assess their short term memory and twelve days later the same test was administered (Retest) to assess their long term memory.

The results indicated that when teaching simple repetitive songs, the rote memorisation method improved the students' short and long term memory. However, when teaching more difficult songs, the whole method significantly improved long term memory and overall understanding of the various elements

DECLARATION

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in the text.

Signature.....

.....

Date...21-07-94.....

of music. The results also indicated that the subjects were able to remember the elements of the songs in isolation using the rote method. They were also able to identify more easily the elements in isolation. For songs taught using the whole method the elements were remembered more holistically. The subjects scored a lot better on the segments of the tests that required a more wholistic understanding and memory of the songs.

These results have implications for both music educators and educators from other curriculum areas who are interested in how students learn and how they remember what they have learned. The results of this report question the acceptability, consistency and reliability of the information processing model and some theories of learning when applied to music teaching. For music teachers, the results may have far reaching implications in the way various songs may be taught in order to obtain maximum memory understanding and transfer.

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CHAPTER ONE

Introduction to the Study

Introduction

The topic for this research is short and long term memory of four chosen songs. The focus deals with the method of instruction used and to what extent the method enhances musical understanding and literacy of year three students. The two methods of instruction that will be investigated are the rote memorisation method and the whole method.

For the purposes of this study, musical understanding and literacy refer to what extent the students can remember by performing (or reconstructing) the elements of music (eg. pitch, time, rhythm, meter, harmony and style and expression) contained in the songs they have learned. As the terms suggest, the rote method form of instruction involves breaking the song into parts and teaching the various musical phrases/lines of music as separate entities whereas the whole method of instruction involves teaching the complete song where the elements of music are learned in a wider, more meaningful and wholistic context.

Background and Purpose of the Study

Lett (1988), reviewed and analysed different kinds of research that have been conducted in Australian Music Education. He found that in the years 1969-1973, the issue of "content - context" tended to emerge. Researchers

needed to address the issue of whether the content and methods of presentation were worthwhile. He also found that there were very few reports of research that identified and investigated a problem thoroughly to allow for a clearer understanding of the issues to be identified. He concluded that more work of this nature was needed in Australia.

In the years 1974-1982 Lett still found that key issues were:

- (i) how children learnt music; and
- (ii) the most appropriate method of teaching music in education.

At an Australian Music Education Seminar, Bridges (1981, cited in Lett, 1988) identified the following issues for music education research. They were:

- (i) teaching strategies effectiveness;
- (ii) decisions on content and presentation;
- (iii) learning - and how it occurs;
- (iv) abilities - teacher responding to; and
- (v) evaluation - problems.

Swanwick (1984) suggests that there are at least three positive outcomes of good research. The first is that a researcher's own teaching improves and benefits from the study. The second is that the professional community is strengthened by deeper knowledge and understanding and the third is that people are better equipped to respond to the challenges of forward planning and

accountability. He questions music educators about enough evidence that school music is important and whether students would be denied insights and opportunities if the programme were abolished. Swanwick also draws attention to general areas of music where research is needed. Two major areas are:

- (i) The students - what makes them "tick" musically and whether/how they develop musically; and
- (ii) The music and the kind of experiences which constitute genuine musical experience.

Since the early 20th century much research has been conducted in memory and information processing in major curriculum areas. An example is E. D. Gagné's (1978) research into the area of reading. However there has not been much research recently into how students learn music and what enhances them in remembering what they have learned. Canelos (1980) found that:

effective information processing of raw information can be significantly facilitated when the learner uses a learning strategy that aids his or her cognitive organisation of the new information (p.244).

He explained that up until that point it had not been determined which learning strategies were most effective for different learning outcomes. Canelos called for more research into finding out which methods enhance better organisation of information into the memory.

This study will investigate the various points mentioned above:

- (i) how students learn music;
- (ii) what teaching strategies should be used; and
- (iii) to what extent context affects retention and understanding.

Hence the significance of this project which previous researchers agree needs to be done especially in music education. This research project also helps to identify whether or not theories about cognition and information processing can be applied across the curriculum in music and not just in maths, science and language.

Aims

The major aim of this research is to investigate to what extent the method of instruction affects musical memory, retention and transfer in Year 3 students. Transfer refers to the students' abilities to state or write the musical elements in a variety of contexts. For example, students who can identify rhythms without the song being sung have been able to transfer their knowledge and understanding into another context.

Research hypothesis

The research hypothesis is:

That the students will have greater retention and musical understanding of the two songs taught by the whole method rather than the rote memorisation method of instruction.

Research questions

Research questions that will be addressed are:

- (i) Is there a significant difference in the amount of the song remembered by students taught by the whole rather than the rote method of instruction?;
- (ii) To what extent does the whole method promote wholistic, or conversely, atomistic ways of thinking about music?;
- (iii) To what extent does the whole method promote transfer of knowledge into various other contexts like rhythmic memory, tempo and intervallic memory?;
- (iv) How readily can students using the whole method of instruction access learned information in their short and long term memories?; and
- (v) Does the accessibility of the learned information differ if students are exposed to the rote method of instruction?

CHAPTER TWO

Literature Review

As stated previously (Gagné, 1978 and Canelos, 1980) research into memory, retention and information processing has been conducted in curriculum areas other than music. The literature review is divided into two parts:

- (i) journals and texts pertaining to music education in general; and
- (ii) other curriculum areas relating to retention and information processing.

Research In Music

A study that has a major impact on the above research is the one conducted by Marrongiello and Roes (1990). They looked at "Children's Memory for New Songs: Integration or Independent Storage of Words and Tunes?" As a base, they used Serafine, Crowder, and Repp (1984). These researchers' results suggested that text and tune of a song are largely integrated in memory. They found that when subjects were told to concentrate only on the tune, they could not ignore the words. Marrongiello *et al.* (1990) chose to use pre-school children to see whether words of a song are remembered alongside the tune. The results showed that children encoded and remembered the tunes with which they were familiar. They concluded that pre-school children encode the words and tune of a song in memory in an integrative or associative way. Marrongiello *et al.* suggest that for further study, a researcher could look at what enhances greater memory of the tune alone.

In 1989, Taylor designed a study to test the hypothesis that instead of using conventional means, the use of physical movement as a strategy for encouraging musical memory would lead to greater success in a recognition test than conventional means. She concluded that to create the physical response, a lot of thought had to be undertaken. The results confirmed that physical movement makes a positive difference to recognition and leads to a higher retention of musical information. Schmidt and Lewis (1987) also tend to concur with these findings.

Gamble (1984) wrote an article on the effectiveness of music in the secondary school. He said that a wide range of relevant experiences would not be sufficient for understanding content unless the learner was in a position to see them as being relevant. This suggests that the context should be presented in a meaningful way. He also concluded that there are positive reasons why creative activities should be included in music. One reason is that they help to develop musical understanding, musical imagination and greater concentration. He suggests that a wholistic method of music instruction may be far better for the students' learning.

Regelski (1982), presents the argument that if music is taught in parts, the learner will perceive music as being fragmented rather than wholistic. He suggests that by teaching the elements of music as separate subjects, the learner

sees little value for what is being learnt. However, if the elements are taught more holistically, the learner can see clearly where and for what the different elements may be used. This approach also advocates motivation and interest which are necessary for cognition and understanding to take place.

Long (1977), conducted a study into whether or not the length of a melody affects the memory of the tune. She concluded that the contour of a melody had a significant impact on the memorising tunes. Hence, the concept of teaching all the elements of music at the same time.

Seashore (1967) stated that a musical mind "does not consist of its dissected parts but remains in an integrated personality"(p.20). He suggests that tonal imagery is a condition for learning, retention, recall and recognition. By taking the total image of music out of the mind, music loses its very essence.

Research in Other Curriculum Areas

McLendon (1982) researched into left and right hemisphere cognitive processes and examined one instructional technique which could be implemented across the curriculum to produce wholistic thinkers. This technique was creative dramatics. This technique encourages divergent thinking which aids the intuitive process of the right hemisphere. She suggested that improvisation uses both hemispheres of the brain and encourages both convergent and divergent thinking. She concluded by saying that if you teach only the left side then only

the left brain learns. If you teach the left and right sides then both brains learn. This means that in order to create wholistic, people who use both sides of the brain to function, you must teach both sides in a wholistic manner showing how the two complement each other.

In the curriculum area of reading, Gagné (1978) wrote an article based on long term retention of information following learning from prose. She found that there are various facilitating conditions that can occur to improve retention. These included: more opportunities for practice, the quality of practice - finding the links for new knowledge to existing knowledge and the timing of practice occasions. She concluded that long term memory functions on encoding and providing links from new knowledge to existing knowledge.

CHAPTER THREE

Theoretical Background

The Theory of Learning

The theoretical underpinnings for this study incorporate the theory of learning, the model of information and the learning of memory processing. The theory of learning states that learning is a process. It provides direction, options and priorities for a teacher's actions (Gagné and Driscoll, 1988). This theory suggests that learning occurs as a result of the interaction of an individual and the environment.

The theory of learning has crystallised over many years. Results of many research studies indicate that there are many learning principles (Gagné & Driscoll, 1988, and Biggs & Telfer, 1981). It is from these learning principles that the theory of learning emerged. The theory has many facets and broadens as more research is conducted into how students learn.

This study follows a cognitive view of learning. It focuses on internal processes rather than external responses. According to Biggs and Telfer (1981), this cognitive model "assumes that man tries to make sense of his environment rather than reacting unthinkingly to it" (p.149).

In the theory of learning from a cognitive perspective there are three stages in learning:

- (i) Attending;
- (ii) Processing - rehearse -saying over and over again - coding - linking;
and
- (iii) Storing.

Attending has a lot to do with motivation. As stated earlier on page 7, if the interest is not evident and the material seems irrelevant, the process of learning will not occur as the student will not be attending. The processing component depends on the form of processing the student has been required to use. This study looks at both ways of processing information and assesses how effectively the information is stored in the short and long term memory.

Gagné (1985, cited in Reigelvth, 1987) suggests that for any learning to take place there is an internal processing of its various stages. These stages which can be enhanced by events of construction are:

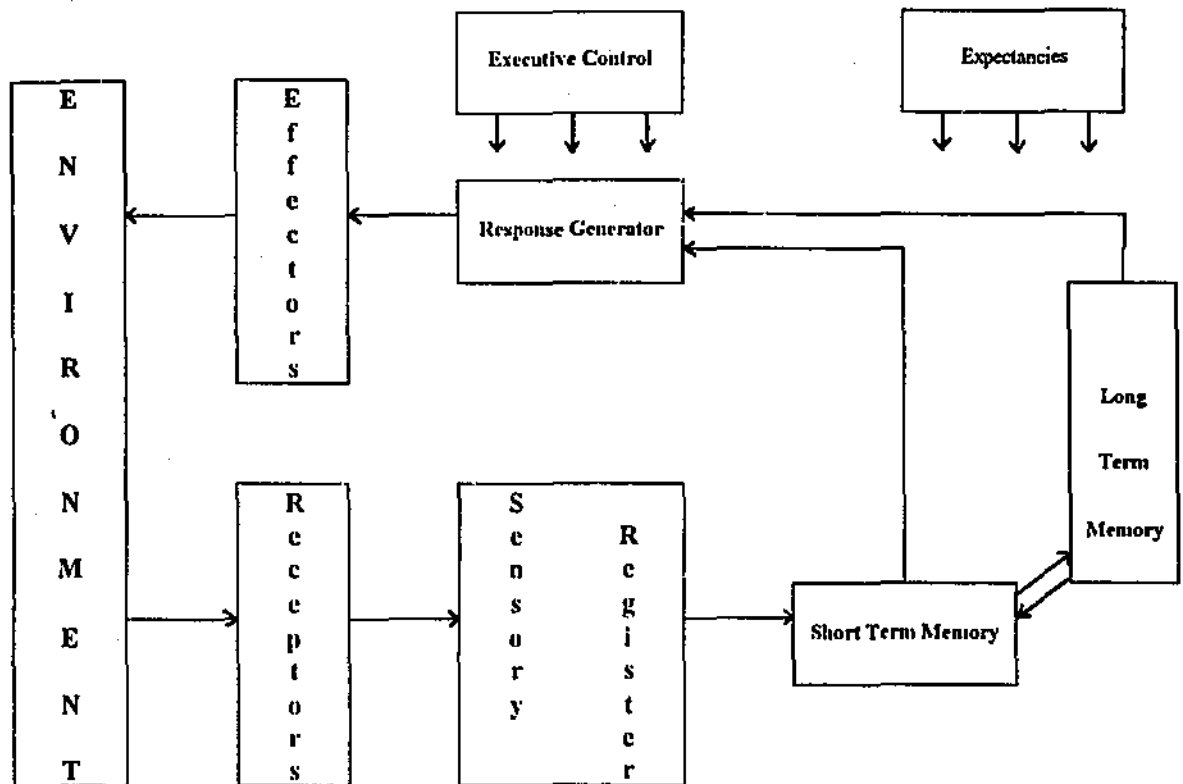
- (i) Gaining attention;
- (ii) Informing the learner of the lesson objective[s];
- (iii) Stimulating recall of prior learning;
- (iv) Presenting the stimulus material with distinctive features;
- (v) Providing learning guidance;
- (vi) Eliciting the performance;

- (vii) Providing informational feedback;
- (viii) Assessing performance; and
- (ix) Enhancing retention and transfer.

In this study the two different instructional techniques are used to see which one enhances retention and transfer.

The Implications of Memory

Information processing theorists approach learning through a study of memory. The model of information processing has been derived from several theorists. For example Atkinson and Shiffrin (1968) and Gagné (1985). It looks like this (as seen in Gagné and Driscoll, 1988, p.13), using a flow chart.



This research study changes the environment (the teaching strategy) to see how effectively the new information moves along the model into short and long term memory.

One theory of memory that this study is based on is that of Neisser's (1967) and Pribram's (1969), cited in Biggs and Telfer (1981, p.83). They suggest that once information is received, it is processed in one of two ways. These are: Dismembering (coding) or Picture Strip (rehearsing). The information is then remembered. In the Dismembering stage, the information can be dismembered in four ways eg. semantic, temporal, spatial and logical.

For this model, if more cross classification is provided, the more easily will information be recovered. By using this process, the learning can be generalised more readily.

The theory of memory affects the short term (or working) memory and the long term memory. Biggs and Telfer (1981) suggest that meaningful learning occurs from coding and that it is much more enjoyable, stable and economical than rote learning. They also suggest that learning with understanding can be rephrased and transferred whereas rote learning, like rehearsing cannot be replayed in a different context. They also suggest that if information is only learned through rehearsing, it is like cataloguing books while ignoring the subject matter of the books.

This study aims to apply these theories used across the curriculum into music education in particular. It aims to support the view that students learn music in a similar way.

CHAPTER FOUR

Methodology

Design

This research focussed on a single variable. The variable was the method of instruction used - rote memorisation versus the whole method. It adopted the post-test only control group design as outlined in Gay (1992). The subjects served as both the control and the experimental groups. The design was quasi-experimental because the subjects were not randomly selected from throughout the whole state.

The school's music teacher conducted the teaching for the experiment and the researcher acted as a participant observer. While observing, the researcher was able to assess the extent to which the procedures were being followed.

Subjects

Using convenience sampling, one class of year three students was chosen from a metropolitan primary school. Convenience sampling was used because it was impractical to random sample students from the whole state. The school was chosen because of close proximity to the researcher's home. However the size of the sample of thirty subjects came from different socio-economic groups

and represented a class of average intelligence. This was confirmed by class records.

Procedure

Four songs were taught to the subjects. Two contrasting songs, Numbers 1 - Cuckoo (easy), and 2 - No Room (difficult) were taught using the rote method of instruction. Another two contrasting songs, Numbers 3 - Little Bird (easy), and 4 - Joseph/Mary (difficult) were taught using the whole method of instruction (See Appendix 1 for the four songs). Songs 1 and 3 were of similar difficulty. Although songs 2 and 4 were equally difficult, they were more difficult than songs 1 and 3. However they were well within the subjects' singing capabilities.

Both sets of contrasting songs (set 1 = 1 & 3, set 2 = 2 & 4) differed in the verbal content, vocal range, amount of repetition, rhythms, mood and the intervallic leaps that comprised their melodies. Songs numbered 1 and 3 about birds, were highly repetitive, with small vocal ranges. They contained common intervals such as S-M, M-R-D and simple rhythms including crotchets and minims. The melodies were predominantly stepwise with a falling melodic contour.

However songs numbered 2 and 4 had a Christmas theme, with very little rhyme or repetition, and used an extended vocal range with difficult intervals

such as D-L, R-L. They contained difficult rhythms including syncopation, dotted note values and quavers.

Contrasting songs of different levels of difficulty were used so that the researcher could determine in the analysis which method of instruction was more effective for remembering a repetitive song compared with a more difficult song. In order to maintain face validity of the research, the four songs were composed by a member of the music faculty at the University. This was done so as to assure that the two songs in each set had similar musical characteristics.

The research was conducted over two separate four week sessions of seven lessons each lasting approximately 35 minutes. The first session dealt with teaching songs 1 and 3 - the repetitive and easier songs. Song 1 used the rote method and song 3 the whole method. The second session dealt with teaching songs 4 and 2 - the more difficult songs. Song 4 used the whole method and song 2, the rote method. In session 2, the order of using each method of instruction was reversed. This procedure was adopted to reduce any bias that may have been introduced by consistently starting with the rote method of instruction. Thus the order was as follows:

Session 1 Rote - easy; Whole - easy; and

Session 2 Whole - difficult; Rote - difficult.

The lessons were conducted on Tuesdays and Thursdays for each week. The retest was conducted on a Monday. The plan for each session was as follows (See Appendix 2 for the lesson plans and Appendix 3 for the test questions):

Session 1 - Easy, repetitive songs.

Week 1

Lesson 1 Song No 1 - focus on words, rhythms and movement using the rote method of instruction.

Lesson 2 Song No 3 - focus on words, rhythms and movement but using the whole method of instruction.

Week 2

Lesson 3 Song No 1 - focus on solfa and tempo using the rote method of instruction.

Lesson 4 Song No 3 - focus on solfa and tempo using the whole method of instruction.

Week 3

Lesson 5 Revision of songs 1 and 3 - focus on all aspects learned (Refer Appendix 2).

Lesson 6 Testing - written test for short term memory. The students were also required to sing individually the two songs to their teacher. This was recorded on video for future analysis.

Week 4

Lesson 7 Approximately two weeks later (12 days) - the same written test was administered to assess long term memory. The students were required to sing the two songs again to their teacher. This was also recorded on video tape.

Session 2 - Difficult songs

Week 1

- Lesson 1 Song No 4 - focus on words, rhythms and movement using the whole method of instruction.
- Lesson 2 Song No 2 - focus on words, rhythms and movement but using the rote method of instruction.

Week 2

- Lesson 3 Song No 4 - focus on solfa and tempo using the whole method of instruction.
- Lesson 4 Song No 2 - focus on solfa and tempo using the rote method of instruction.

Week 3

- Lesson 5 Revision of songs No 4 and 2 - focus on all aspects learned.
- Lesson 6 Testing - written test for short term memory. The subjects were also required to sing individually the two songs to their teacher. This was recorded on video for future analysis.

Week 4

- Lesson 7 Approximately two weeks (12 days) later - the same written test was administered to assess long term memory. The subjects were required to sing the two songs again to their teacher. This was also recorded on video tape.

For both sessions (1 and 2) the same activities were planned in corresponding lessons to maintain consistency.

In Session 1, both songs were given the same amount of time. Although the subjects spent the same amount of time learning each song, they did not necessarily sing each song the same number of times.

In Session 2, both songs were sung the same number of times overall for each activity. However, when taught by rote, the subjects required between five and ten minutes longer for each lesson.

This research project was trialled first on a smaller scale before teaching and data collection took place. In the pilot project another convenience sample of a year three class from a metropolitan primary school was used. The researcher taught the first two lessons on Session 1 to the subjects. The content of these two lessons was tested using taped exercises similar to those described on page 22. The subjects were required to sing the two songs individually to the researcher. The pilot study was conducted to:

- (i) find out if the time needed to teach using both methods was similar;
- (ii) trial the test on tape to assess its effectiveness; and
- (iii) identify the miscues to use on the singing test.

Miscues refer to the errors that students make whilst singing, reading, writing or speaking. While the subjects in the pilot project were singing the songs, the researcher recorded the types of errors that were made. This record served as a guide to the types of errors or miscues that the subjects in the research project may have made. These errors included omissions, additions, pauses, incorrect rhythms, incorrect pitch, and incorrect words. The miscues were given codes to be used to assess the subjects' accuracy in singing the songs. Marks were then deducted for each miscue recorded. Each subject lost one mark per miscue made. By counting all the miscues, the subject received a total mark for each song.

Throughout the research, the teacher and the researcher kept anecdotal records that were important to the research. These evaluative notes indicated how quickly the subjects learned a song and how the activities helped the subjects learn the songs and the musical elements involved.

Data Collection

The researcher had a copy of each lesson plan and marked off each activity as it occurred, counting the number of its repetitions to assess accuracy. A video recording was taken of each lesson for future analysis. A check was also made as to how well the lesson procedures were being followed. The video camera was also used during the lessons to help minimise the Hawthorn effect. By the time the subjects had to sing individually, the presence of the video

camera was ignored because it had become part of every lesson and it was not looked on as a novelty item.

The written test component consisted of the following items (See Appendix 3 for the test items):

- (i) memory of written words - subjects were asked to write the words of each song;
- (ii) memory of rhythms that occurred at different places in the songs. These items were on tape;
- (iii) memory of intervals that occurred at different places in the songs. These exercises too were on tape; and
- (iv) memory through tempo. Segments of the songs sung to "lah" at varying speeds (slow and fast).

The tape was used as a motivational device and also to improve reliability and validity of the testing procedures. If the questions were in written form, the subjects may well have been tested on language comprehension rather than on tonal memory. The exercises on the tape were structured to reflect the way in which the subjects had learned the songs. Their learning was predominantly aural rather than notational. Using rotational testing procedures may have produced biased results due to the unfamiliarity of the technique.

On the tape, the subjects were told to be "Rhythm" and "Interval" detectives. On tape were clapped rhythms and intervals which were sung. The subjects had to write down the words of the song that corresponded with the rhythm or interval patterns sounded. To test tempo, the researcher sang phrases of the songs to "Lah" - at slow and fast tempi. The subjects had to write down the words of the song which corresponded with the phrase that had been sung.

The reliability of the written test was determined by using Cronbach's coefficient alpha. The content, construct and face validity were assessed by members of the music faculty at the University.

The singing component of the test assessed the subjects' memory of the tune. It was also recorded on video camera. Extra marks were given for subjects who could sing the songs to "Lah" without using the words to aid their memory. Subjects were all given the same pitch for their starting note. Marks were deducted for miscues such as omissions of rhythms or notes, additions of rhythms or notes, incorrect rhythms, incorrect pitch, pauses and repetitions.

Each segment of the test was allocated ten marks out of a total of fifty marks.

Analysis

Each of the four songs was tested. Each test consisted of five segments (words, rhythm, intervals, tempo, melody). The songs were then retested, making a total of eight tests and therefore forty entries. Each of the segments on the eight tests was analysed as a separate entity. This was to identify the music elements which hindered or accelerated learning and memory using the two different teaching methods. This means that there were forty entries in total - 1 - 5 (Cuckoo), 6 - 10 (Cuckoo - retest), 11 - 15 (Little Bird), 16 - 20 (Little Bird retest), 21 - 25 (Joseph/Mary), 26 - 30 (Joseph/Mary retest), 31 - 35 (No Room), and 36 - 40 (No Room retest). The mean and standard deviation for each segment on each of the eight tests were recorded.

For each segment there were two components - one mark for the first test and another mark for the retest. The mean and standard deviation of the class marks for each segment on both the test and the retest were tabled. There were also a mean and standard deviation for the overall class mark for both tests in all four songs. For example:

Session 1 - Easier songs - No 1 - Cuckoo song

Test - Song 1
Class Scores

Segments	Component 1		Component 2 (Retest)	
Words	Class Average & SD*	----	Class Average & SD	----
Rhythms	Class Average & SD	----	Class Average & SD	----
Intervals	Class Average & SD	----	Class Average & SD	----
Tempo	Class Average & SD	----	Class Average & SD	----
Melody	Class Average & SD	----	Class Average & SD	----
	Overall class average and SD for Song 1	----	Overall class average and SD for Song 1 (Retest)	----

*SD = Standard Deviation

The same system was used for songs 2 - 4.

For each test the frequency distribution of each subject's score was calculated. This was then tabled and compared with the total scores of each subject on each test. This table showed the distribution of the scores and where the larger proportion of scores were positioned.

For both the test and retest of each song, a separate t-score was derived from the mean and standard deviation of the class scores. This score indicated if there were any significant differences between the test/retest scores. A correlation coefficient was also derived from the test/retest scores. The Pearson "r" Correlation was used due to the size of the subject sample. The coefficient provides more statistical evidence when used with the t-score. For example, for each song, the more significant the t-score, the less correlated (or similar) are

the results on the two tests. Conversely, the less significant the t-score, the more correlated (or similar) are the results on the two tests.

For each session, a t-score was derived to assess the significant difference between both songs. There were four t-scores (numbered 1-4) in total. For example:

Session 1	Easy songs	1 Test 1 - Cuckoo and Little Bird
		2 Retest - Cuckoo and Little Bird
Session 2	Difficult songs	3 Test 1 - Joseph/Mary and No Room
		4 Retest - Joseph/Mary and No Room.

These scores were tabled to compare the significance, if any, of the differences in the results of each song in each session.

CHAPTER FIVE

Results

In this chapter the results for the eight tests are recorded in various tables. A paragraph precedes each table explaining the contents of the table.

Table 1 records the mean and standard deviation of the subjects' scores for each of the segments on each of the tests. The numbers in the columns correspond with the songs. Nos 1 - 5 = Cuckoo, 6 - 10 = Cuckoo - retest; 11 - 15 = Little Bird, 16 - 20 = Little Bird - retest; 21 - 25 = Joseph/Mary, 26 - 30 = Joseph/Mary - retest; 31 - 35 = No Room and 36 - 40 = No Room - retest.

The letters in the left hand column refer to the segment of each test. For example: W = Words, R = Rhythms, I = Intervals, T = Tempo and M = Melody/Singing.

Table 1
Mean and Standard Deviation for All the Class Scores

Number	Segment	No of cases	Minimum	Maximum	Mean	Standard Dev.
1	W	29	2.27	10.00	9.40	1.76
2	R	29	4.00	10.00	8.62	2.51
3	I	29	0.00	10.00	6.17	3.92
4	T	29	0.00	10.00	7.59	3.09
5	M	29	4.12	10.00	7.44	1.46
6	W	28	2.27	10.00	9.27	1.94
7	R	28	0.00	10.00	8.64	2.78
8	I	28	0.00	10.00	6.14	3.45
9	T	28	0.00	10.00	7.14	3.63
10	M	28	1.75	10.00	7.43	1.98
11	W	29	0.00	10.00	7.65	3.00
12	R	29	0.00	10.00	7.14	2.90
13	I	29	0.00	10.00	5.86	2.50
14	T	29	0.00	10.00	5.17	4.26
15	M	29	2.25	10.00	7.96	1.91
16	W	28	5.40	10.00	9.43	1.23
17	R	28	0.00	10.00	7.00	2.75
18	I	28	0.00	10.00	4.71	3.28
19	T	28	0.00	10.00	4.00	3.77
20	M	28	2.50	10.00	7.69	1.65
21	W	29	0.00	10.00	8.67	3.04
22	R	29	0.00	10.00	2.21	2.90
23	I	29	0.00	10.00	4.28	3.66
24	T	29	0.00	10.00	5.31	3.75
25	M	29	5.75	10.00	8.27	1.57
26	W	29	0.00	10.00	9.06	2.18
27	R	29	0.00	10.00	3.55	4.00
28	I	29	0.00	7.00	4.83	3.16
29	T	29	0.00	10.00	5.48	4.02
30	M	29	5.75	10.00	8.51	1.42
31	W	29	0.00	10.00	7.63	3.40
32	R	29	0.00	10.00	4.97	3.77
33	I	29	0.00	10.00	2.79	3.44
34	T	29	0.00	10.00	6.62	3.82
35	M	29	1.00	10.00	7.02	2.19
36	W	29	0.00	10.00	7.32	3.32
37	R	29	0.00	10.00	3.97	3.43
38	I	29	0.00	10.00	2.62	3.34
39	T	29	0.00	10.00	6.00	3.74
40	M	29	2.50	10.00	7.22	2.01

Table 2 shows the frequency distribution of all the subjects' total scores in the eight tests. The scores have been placed into 5 mark ranges for easier analysis. Each song has two columns - one for the first test and the second for the retest. Students who were absent have been recorded in the "no score counted" bracket.

Table 2
Frequency distribution of Total Scores

Total Scores	Cuckoo		Little Bird		Joseph/Mary		No Room	
	1	2	1	2	1	2	1	2
No score counted	1	2	1	2	1	1	1	1
0 - 4.99	0	0	0	0	0	0	1	1
5 - 9.99	0	0	0	0	2	1	1	2
10 - 14.99	0	0	2	0	3	0	1	1
15 - 19.99	0	1	1	2	3	3	3	2
20 - 24.99	2	3	4	5	4	4	5	4
25 - 29.99	3	1	3	5	4	5	6	5
30 - 34.99	5	6	8	5	6	5	4	6
35 - 39.99	6	6	5	7	3	4	6	7
40 - 44.99	5	5	3	3	3	6	2	1
45 - 49.99	7	6	2	1	0	1	0	0
50	1	0	1	0	1	0	0	0

Tables 3 - 6 show the mean and standard deviation for each song. The two components are the first test and the retest. The total class score for each song has also been included. These tables also show the differences in the mean and standard deviation between the two tests of each song.

Table 3
Mean and Standard Deviation for Cuckoo

Segments	Session 1 - Cuckoo			
	Component 1 (test)		Component 2 - (retest)	
	Mean	SD	Mean	SD
Words	9.40	1.76	9.27	1.94
Rhythms	8.62	2.51	8.64	2.78
Intervals	6.17	3.92	6.14	3.45
Tempo	7.59	3.09	7.14	3.63
Melody	7.44	1.46	7.43	1.98
Total for Cuckoo	39.22	7.72	38.30	8.59

Table 4
Mean and Standard Deviation for Little Bird

Segments	Session 1 - Little Bird			
	Component 1 (test)		Component 2 - (retest)	
	Mean	SD	Mean	SD
Words	7.65	3.00	9.43	1.23
Rhythms	7.14	2.90	7.00	2.75
Intervals	5.86	2.50	4.71	3.28
Tempo	5.17	4.26	4.00	3.77
Melody	7.96	1.91	7.69	1.65
Total for Little Bird	33.78	9.85	32.57	8.05

Table 5
Mean and Standard Deviation for Joseph/Mary

Segments	Session 2 - Joseph/Mary			
	Component 1 (test)		Component 2 - (retest)	
	Mean	SD	Mean	SD
Words	8.67	3.04	9.06	2.18
Rhythms	2.21	2.90	3.55	4.00
Intervals	4.28	3.66	4.83	3.16
Tempo	5.31	3.75	5.48	4.02
Melody	8.27	1.57	8.51	1.42
Total for Joseph/Mary	28.73	10.49	31.43	9.96

Table 6
Mean and Standard Deviation for No Room

Segments	Session 2 - No Room			
	Component 1 (test)		Component 2 - (retest)	
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>
Words	7.63	3.40	7.32	3.32
Rhythms	4.97	3.77	3.97	3.43
Intervals	2.79	3.44	2.62	3.34
Tempo	6.62	3.82	6.00	3.74
Melody	7.02	2.19	7.22	2.01
Total for No Room	29.03	10.19	27.13	10.41

Table 7 shows the mean difference and the t-score that has been derived from the mean and standard deviation on each test for each of the four songs. A Pearson correlational coefficient has also been included in the table. Both these figures evaluate the differences between the scores obtained on the two tests for each song.

Table 7
t-Score and Pearson Correlation Coefficient for Each Song

Songs	Mean Difference	DF	t	P	Pearson Correlation
Cuckoo 1 & 2	-0.70	26	-0.611	0.546	0.736
Little Bird 1 & 2	-0.16	26	-0.088	0.931	0.44
Joseph/Mary 1 & 2	2.72	27	1.899	0.068	0.34
No Room 1 & 2	-1.55	27	-1.024	0.315	0.70

$p \leq .05$

Table 8 shows the two t-scores that have been derived for each session. The first of these scores looks at the mean differences and standard deviation for

the first test on Cuckoo and Little Bird. The second score shows the mean difference and standard deviation for the retest on Cuckoo and Little Bird. The other two t-scores deal with the mean differences and standard deviation for the first test and retest of the songs Joseph/Mary and No Room.

Table 8
t-Scores for Both Tests in Each Session

<i>Sessions</i>	<i>Overall Mean</i>		<i>Mean</i>	<i>Standard</i>	<i>DF</i>	<i>T</i>	<i>Probability</i>
			<i>Difference</i>	<i>Deviation</i>			
1 - Cuckoo & Little Bird	Cuckoo	Little Bird					
Test 1	39.22	33.78	5.437	10.271	28	2.851	.008*
Test 2	38.30	32.57	5.729	6.911	26	4.307	.000*
2 - Joseph/Mary & No Room	Joseph/Mary	No room					
Test 1	28.73	29.03	-0.298	9.436	28	-0.170	.866
Test 2	31.43	27.13	4.296	8.002	28	2.891	.007*

$p \leq .05$

This chapter has all the results for the class scores on the eight tests. The records include the mean and standard deviation for each segment, the total scores, and each segment on each song; the frequency of each class score; a t-score and Pearson correlation coefficient for each song over the two tests and a t-score comparing the scores on the two songs in each test.

CHAPTER SIX

Discussion of Results

This chapter focusses on the results and discusses a number of trends and occurrences that can be seen in the results. There are three sections to this chapter. The first deals with the statistical findings, the second with the observational findings and the third summarises the conclusions based on the research questions.

Statistical

Discussion of results in table 1

In Table 1 the segments with the highest scores in the tests can be identified. Over the eight tests, the words and melody segments recorded consistently high scores. The subjects scores for the easier songs in Session 1 (song numbers 1 and 3) indicate the subjects remembered the rhythms fairly well. It is interesting to note that for Session 2 with the more difficult songs (numbers 2 and 4), the rhythm segments did not register high scores. However, the scores for the tempo segments were relatively high in comparison with the rhythm and interval segments.

In both sessions the subjects' memory was very weak for the intervals and their position in each song. This was particularly so for Songs 2 and 4 in Session 2. This may have been because the songs had more large difficult

intervallic leaps throughout their melodies. The intervals may well have been too hard for year threes to negotiate. However, the subjects were still able to sing the songs accurately. This would indicate that difficulties arose when children were asked to identify intervals in isolation. This result tends to concur with the findings of Hargreaves (1990) and Konečni (1982) that music is best learnt when approached in its ecologically wholistic setting.

The only category in which no subject achieved a maximum score of ten marks was in the Interval segment of the retest of the Joseph/Mary song which used the whole method of instruction. These results indicated that when testing for long term memory the whole method was not as effective for hearing intervals in isolation as was the case with the rote method. Yet when the subjects sang the Joseph/Mary song, their intervals were more accurately pitched than the No Room song taught by the rote method.

Discussion of results in table 2

The frequency distribution of the total scores indicates where the larger proportions of the subjects' marks lie. Looking at Table 2, it is clear that for the Cuckoo and Little Bird songs (Session 1) there were a lot of subjects with high marks. For the Cuckoo song, there were only two subjects with a score below 25 in the first test compared with four in the retest. The results are more consistent for the Little Bird song. There were seven subjects who scored below 25 in both tests. However, this grouping changed significantly. The frequency

was: 2(10 - 14.99), 1(15 - 19.99) and 4(20 - 24.99) for the first test and 2(15 - 19.99) and 5(20 - 24.99) for the second test (retest). The range of the scores on the retest for the Little Bird song was narrower. The whole method of instruction resulted in low range class scores.

The low total scores for the songs Joseph/Mary and No Room (Session 2) reflect that the songs were harder. The subjects had a wider range of scores in the 5 - 9.99 for Joseph/Mary and for No Room 0 - 4.99 ranges. One subject scored 50 for Joseph/Mary on the first test but no other score of 50 was achieved. The scores for the retest of Joseph/Mary were better. On the retest, there were six subjects who scored between 40 - 44.99 compared with only three in the first test. As with Little Bird which was also taught by the whole method, the scores for Joseph/Mary were "bunched" together. The scores for No Room were irregular and erratic with one or two subjects scoring in each range. There was no consistency in the results.

Discussion of results in table 3 - 6

Tables 3 - 6 show the average scores for the class on each segment of the two tests for each song. They also include an average mark for the total score of each song. For Cuckoo, Little Bird and No Room, the retest scores in each section were lower (except Rhythms for Cuckoo and melody singing for No Room) as were the overall scores for these songs. The only song that had higher scores on the retest was Joseph/Mary which used the whole method.

The standard deviation of the total scores for each song also changed. The mean score of songs taught by the rote method (Cuckoo and No Room) went down but the standard deviation rose. This indicated a wider spread of scores. The songs using the whole method (Little Bird and Joseph/Mary) had different mean scores yet the standard deviations decreased. This would indicate that the spread of scores was smaller and more closely grouped.

Discussion of results in table 7

Once the total scores were finalised, a t-score was derived to assess if there was a significant difference in the two tests of each song. A Pearson correlation was also derived to provide another statistical measure to confirm the t-score. Table 7 records the figures. As the table suggests, the mean difference for three of the songs registered negative scores. This suggests that the mean score on the retest was lower than the mean score on the first test. But the mean score for Joseph/Mary increased by 2.72 marks.

Using a significance level of $p \leq .05$, no scores were significant. However, the score for Joseph/Mary was approaching significance ($p .068$). This means that the increase in the scores on the retest for Joseph/Mary is approaching the point when it can be said that the method of instruction helped the subjects to remember the more difficult song rather than by a chance variable.

The Pearson correlation provided another form of statistical information to confirm the t-score. The higher the correlation (0.6 - 1), the greater the similarity between the scores. The lower the correlation (0.5 - 0) the less the similarity between the scores. According to the Pearson coefficient, the two songs taught by the rote method (Cuckoo and No Room) were highly correlated. This means that the scores remained fairly consistent in both short and long term memory. The coefficients for the two songs taught by the whole method (Little Bird and Joseph/Mary) are not correlated at all. The figures for Joseph/Mary are not correlated at all. The correlation coefficient for Joseph/Mary is particularly low (0.34) compared with the others.

Assumptions about how well the information was stored and retrieved in long term memory could not be made on the Cuckoo, Little Bird and No Room song based on both sets of data. The probability of chance affecting the results is extremely high for the three songs and errors could be made in interpreting the correlation coefficients without taking into consideration the "chance" factor. The results from Joseph/Mary are the only ones that have statistical merit but only to the extent that the probability is approaching significance.

Discussion of results in table 8

Table 8 shows the final set of statistical results. This table includes the t-scores of both songs for the two tests in both sessions. The table also includes

the two mean scores, mean difference, standard deviation and the probability coefficient. In Test 1 Session 1, the difference between the means of Cuckoo and Little Bird is fairly large. The standard deviation is also large. The probability that the difference is due to chance is .008. This is very significant. This means that in the first test, the subjects did significantly better with the Cuckoo rather than the Little Bird song. Thus where the easy songs were concerned, the subjects performed better using the rote rather than the whole method of instruction when assessing short term memory.

The results for the retest are also highly significant. Although both mean scores dropped, the Cuckoo song dropped less. This means it was remembered to a higher degree. The probability of the difference being due to chance was .000. This shows that for long term memory, the subjects recalled the Cuckoo song (taught by the rote method) significantly better overall than the Little Bird song (taught by the whole method).

The second session's results are different. The scores for the first test were relatively the same. The mean difference of -0.298 ($t = 0.170$) indicates this. It also shows that the subjects did a little better on the No Room song. The probability of the difference being caused by chance is very high. This means there was no significance in the results regarding short term memory.

The significant difference occurs in the long term memory. The retest mean score for Joseph/Mary was higher but lower for No Room. The retest score for Joseph/Mary rose above the first test score for No Room. The difference between the retest scores for both songs is statistically significant ($p \leq .007$).

Observational

Throughout the research, various observations were made about how the subjects learnt. A major observation was the different ways in which boys and girls learned. The girls were very quick at learning the songs and had high scores in the first test. The boys scores were lower in the short term test but improved in the long term retest. Perhaps there is a gender link in the way children learn and remember. It appears as if the boys needed more information processing time.

The use of certain activities also helped to consolidate musical ideas. In Session 2, the subjects were able to sing the songs with very accurate rhythms and syncopation. This may be linked with the activities in which they were involved. The subjects had to sit in pairs where one clapped the rhythm while the other tapped the beat. They then had to walk to the beat and clap the rhythm. It was very interesting to notice the change in the subjects' abilities to "feel" the syncopated rhythm after these activities.

The use of the Human Piano - seven/eight subjects representing the solfa notes of the songs, helped to reinforce the melodic contour of the melody. The subjects were able to identify the high and low points of the melody which aided their memory of the tune. These observations place a large emphasis on the effectiveness of the types of activities that are used to promote learning and memory.

Conclusions

These conclusions are related to the research questions outlined in the Chapter 1 - Introduction to the Study. The major aim of this research was to investigate the extent to which the method of instruction affected musical memory, retention and transfer in Year 3 students.

Research question one

Is there a significant difference in the amount of the song remembered by students taught by the whole rather than the rote method of instruction?

The statistical data from the results show that there is a significant difference in the amount of the song remembered when students are taught by the whole method. However, the results of Session 1 (easy songs) show that the subjects did not perform as well on the Little Bird song as they did on the Cuckoo song - which used the rote method.

In Session 2 (difficult songs) the subjects performed a lot better on the retest of the Joseph/Mary song - which used the whole method. The scores on the short term memory test were very similar. From these results it can be assumed that if a teacher wants to teach more difficult songs and have the students retain the songs in their long term memories, the whole method of instruction should be used with easy songs. The reverse is the case where the rote method of instruction should be used.

Research question two

To what extent does the whole method promote wholistic, or conversely, atomistic ways of thinking about music?

By looking at Table 1 in Chapter 5, it is clear to see which segments scored higher than others. It is interesting to note that the scores for the singing component on each test were higher for the songs taught by the whole method of instruction. These results are in the following rows: 15 compared with 20 and 25 compared with 30. The results were higher because the subject remembered the rhythm patterns, melodic intervals and the tempo more accurately in the songs which used the whole method. The subjects were also able to remember the words of the songs taught by the whole method better for the retest (retest - rows 16 and 26) compared with the first test. These scores were higher than the first test and retest scores of the songs taught by the rote method.

For Session 1, the scores for the rhythm, interval and tempo segments were very low for the Little Bird song. The Cuckoo registered higher scores and it used the rote method. For Session 2, the rhythm and tempo segments had higher scores for No Room (rote method) than Joseph/Mary (whole method).

These results would indicate that the rote method promoted atomistic thinking where subjects were able to isolate the elements of music more readily. The whole method promoted a more wholistic view of thinking about music where the elements were seen as an entity in the song as a whole. The whole method caused problems when all elements were introduced in isolation but the subjects were able to remember the words better and sing the whole song more accurately.

Research question three

To what extent does the whole method promote transfer of knowledge into various other contexts like rhythmic memory, tempo and intervallic memory?

The answer to this research question is very similar to the answer to research question 2. The subjects had a lot of difficulty identifying the words of the song that corresponded with the rhythms, intervals and tempo segments presented in isolation in the test. This does not mean that they did not know the

rhythms, intervals and parts of the songs sung at different speeds. As indicated before (p.44) the subjects were very accurate in the rhythms, intervals and tempo throughout the singing component of the test.

The results of Session 2 indicated that the subjects improved their scores for Joseph/Mary in the rhythm, interval and tempo areas as well as in the words and the singing component. Table 5 shows the changes in the scores: words - 8.67 - 9.06, rhythm - 2.21 - 3.55, intervals - 4.28 - 4.83, tempo - 5.31 - 5.48 and singing - 8.27 - 8.51. Overall, the total average mark for Joseph/Mary rose from 28.73 to 31.43. These rises in the scores indicate that there was more processing of the information between the testing times. This may suggest that children need more information processing time for difficult songs taught by the whole method of instruction if transfer of the knowledge into long term memory is to occur.

Research questions four and five

How readily can students using the whole method of instruction access learned information in their short and long term memories? Does the accessibility of the learned information differ if students are exposed to the rote method of instruction?

The results indicated that the subjects had varying degrees of ease at accessing the information. In Session 1, the information about the Cuckoo

(rote) song was more readily accessed when presented in isolation. The Little Bird (whole) song did not score as highly on the separate elements. However, the subjects were able to access the words of the song easily and they were able to sing the song more accurately in all of the elements than the Cuckoo song. This indicated that the subjects remembered the information in a wholistic or Gestalt manner when the information was readily accessible within certain contexts - the rote method promoted easier accessibility of the information when the elements were presented in isolation.

In Session 2, the subjects were able to access the information more readily in the Joseph/Mary (whole) song rather than in the No Room (rote) song. More processing was needed to remember the more difficult songs. As stated previously (p.43) more processing means more information reaching the long term memory. In this research the whole method of instruction required that no song be presented as separate elements of rhythm, intervals, tempo and words. Because of this, the information remains stored as a song rather than as each separate musical element. In this way it becomes more meaningful contextually and hence more readily accessible.

These results can be summarised as follows: when teaching a difficult song using the whole method, more information processing occurs which is stored in the long term memory within the context it was taught. It can then be easily accessed when needed.

Research hypothesis

That the students will have greater retention and musical understanding of the two songs taught by the whole method rather than the rote memorisation method of instruction.

The results have shown that with the easy songs (Session 1) the rote method was significantly better on the retest - for long term memory whereas for the difficult songs (Session 2) the whole method was significantly better. The results also showed that there was no significant difference in the first test scores for Session 2. This would indicate that there is no significant difference between the amount of the songs remembered when testing short term memory only. The differences occurred in long term memory.

Therefore, the research hypothesis is accepted to the extent that in more difficult songs, the whole method of instruction promoted greater retention -long term and musical understanding of the song. It is rejected in that the whole method does not promote greater retention where short and long term memory and musical understanding of easy songs are concerned. The rote method promoted better retention and musical understanding of the easier songs.

CHAPTER SEVEN

Implications and Recommendations

In this chapter, the implications and recommendations to be discussed will apply to other curriculum areas as well as to music.

Limitations of the Study

Before stating any implications and recommendations this study has uncovered, it is necessary to list the limitations. These were:

- (i) Subjects were not randomly selected from the wider community - convenience sampling was used;
- (ii) In order to generalise the findings from a more representative sample, more of the same age groups would need to be studied;
- (iii) Subjects' memory of the first post test may have affected the results of the second test (retest): For instance, knowing what the questions would be;
- (iv) The research was time consuming - there were several subjects who were away from school at various stages throughout the research; and therefore the statistical results should be read with caution; and
- (v) Subjects singing in the playground and at home could not be controlled and may well have contaminated the results.

Implications of the Study

The results of this research have implications for music and other curriculum areas such as language arts. As stated in the introduction, the results give an insight into how students learn music, the teaching strategies to be used and the extent to which the context affects retention and understanding. Even though the subjects were not randomly sampled, the sample may be representative of year three students in Western Australia for the following reasons: the diversity of socio-economic groupings within the sample, the ranges of intellectual ability from below average to well above average and the various ethnic backgrounds. It is with these factors in mind that the implications are generalised.

The conclusions derived from the research have shown that students learn music in a variety of ways. There are situations where the rote and whole method of instruction are the appropriate techniques to use. When teaching easy, repetitive songs, the most appropriate method of instruction to use appears to be the rote method. When teaching more difficult songs, students retain the information better if the whole method is used.

From the results, it appeared that students needed more information processing time. The boys in particular performed better in the retest (second post test) than they did in the first post test. Teachers should be made aware of

differences in learning and which teaching methods to use if optimum learning of songs is to occur.

Throughout the research it was evident that various strategies were more beneficial to use when emphasising certain music elements. Music lessons need to be full of activities that promote learning, understanding, retention and transfer. This study used activities like partner clapping and use of the human piano, walking to beat and clapping the rhythm, question and answer and elimination games.

The benefits of certain teaching strategies are more evident when teaching difficult songs which contain syncopation and large intervallic leaps. In this research partner activities for beat and rhythm were useful in helping the children feel the steady beat (person tapping their back) while concentrating on the syncopated rhythm. Walking round the room and clapping the rhythm was a very worthwhile extension of the previous activity. Using the human piano helped the children to visualise what the melody looked like while they sang the large (or small) intervallic leaps contained in the songs. These activities helped to promote learning and retention of the elements within the songs.

Context is important in retention and understanding. Subjects found the easy songs, easier to learn when taught by rote. However, when the more difficult songs were learned, the whole method promoted better long term

retention and understanding. Therefore, if the aim is to promote retention as well as musical understanding then the whole method approach is the best strategy to use. This approach helps children see how all the various elements (rhythm, pitch, meter, harmony) fit in a song.

Some of the findings in this research may be applied to other curriculum areas. This is particularly so for the Language Arts area. This research aimed to see if students learned music in a similar way in which they learned language.

It has been shown in language research that context is very important to retention and understanding. It has also been shown that certain aspects of language such as grammar should be taught by rote yet within a wholistic context. This means that though it must be specifically taught by repetition, the reasons for doing it must be evident to the learner. Children must see the whole first (the text) and then break it down into its various parts (grammar) and use their new knowledge to enhance understanding of a new text - that is whole-part-whole. With music too, students need the contextual background where everything coheres in a song despite such disparate elements as difficult intervals or syncopation which may be mastered by rote through repetitive skills.

It appears there ought to be a balance between the rote and whole method of teaching. Teachers may use the strategy that suits the purpose they wish to achieve. They should keep in mind that while rote method techniques

tend to promote atomistic thinking about music, the whole method encourages wholistic thinking about music (or whatever the subject area). These thinking stances also affect how the information is stored and retrieved:

- (i) rote - elements/segments in the memory in isolation; and
- (ii) whole - songs made up of elements/segments

Recommendations For Future Research

The results of and implications for this study indicate that more research needs to be conducted regarding immediate or long term memory in music. This may then be compared with results in other curriculum areas such as language, arts or mathematics.

Immediate

- (i) In order to generalise the findings more effectively a random sample of more students would need to be studied. This study may then be replicated with a more representative sample.
- (ii) To test for long term memory, more time could be given between the two post tests. This would indicate whether the results collected after 12 days would be similar to or different from those collected with a longer break period. A longer break would give an accurate representation of how well the subjects actually retained the information and the various musical elements that affect long term memory.

- (iii) Studying different age groups would also provide more information on how students learn music. This study focussed on Year three students only. More age groups would identify learning trends and changes that may occur in what enhances learning and retention as the children develop.

Long term

- (i) More research into which activities promote better learning and memory would also be helpful. The activities used in this research appeared to aid short and long term memory. An investigation into activities would be beneficial to all music teachers who wish to give their students the best opportunities to learn.
- (ii) Another issue arising from this research is the differences between how boys and girls learn songs. It was evident throughout the research that boys performed better in the retest than in the first test. An investigation into gender based learning trends would be beneficial to teachers who wish to promote an optimum learning environment for all their students.
- (iii) Attempting this type of research in other curriculum areas would give an insight into cross-curricula learning. Similarities of learning trends may become evident. All areas of curriculum would benefit from strategies

that were found which could be used in other areas to achieve maximum learning, understanding, retention and transfer of subject material.

These recommendations would encourage further exploration of how students learn and remember. Any information discovered in this area could only be of benefit to the students who are involved in the education system.

REFERENCES

- Biggs, J. & Telfer, R. (1981). *The process of learning*. Sydney: Prentice Hall
- Canelos, J. J. (1980). Evaluation of three types of instructional strategy for learner acquisition of intervals. *Journal of Research in Music Education*, 28, 4, 243-249
- Cheyette, I., & Cheyette, H. (1969). *Teaching music creatively in the elementary school*. New York: Mc Graw-Hill.
- Dunbar-Hall, P. (1991). Music and language commonalities in semiotics, syllabus and classroom teaching. *British Journal of Music Education*, 8, 65-72.
- Gagné, E. D. (1978). Long term retention of information following learning from prose. *Review of Educational Research*, 48, 4, 629-665.
- Gagné, R. M., & Driscoll, M. P. (1988). *Essentials of learning for instruction* (2nd ed). Englewood Cliffs: Prentice Hall.
- Gagné, R. M., & White, R. T. (1978). Memory structures and learning outcomes. *Review of Educational Research*, 48, 2, 187-222.
- Gamble, T. (1984). Imagination and understanding in the music curriculum. *British Journal of Music Education*, 1, 1, 7-25.
- Gay, L. R. (1992). *Educational research: Competencies for analysis and application* (4th ed). New York: Merrill.
- Hargreaves, D. J. (1986). *The developmental psychology of music*. Cambridge: Cambridge University Press.
- Hickok, D., & Smith, J. A. (1974). *Creative teaching of music in the elementary school*. Boston: Allyn and Baron.
- Konečni, V. J. (1982). Social interaction and musical preference, in *Psychology of music*, ed. D. Deutsch. New York: Academic Press.

- Lett, W. R. (1988). Research in Australian music education: A review and analysis. *British Journal of Music Education*, 5, 2, 141-156.
- Long, P. A. (1977). Relationships between pitch memory in short melodies and selected factors. *Journal of Research in Music Education*, 25, 4, 272-281.
- McLendon, G. H. (1982). Exploring the research concerning left hemisphere/right hemisphere cognitive processes and examining one instructional technique which may be implemented across the curriculum to produce holistic thinkers. *ERIC Document*, 223541.
- Mills, J. (1991). *Music in the primary school*. Cambridge: University Press.
- Marrongiello, B. A., & Roes, C. L. (1990). Children's memory for new songs: Integration or independent storage of words and tunes? *Journal of Experimental Child Psychology*, 50, 1, 25-38
- Nye, R. E., & Nye, V. T. (1970). *Music in the elementary school* (3rd ed). Englewood Cliffs: Prentice-Hall.
- Perrin, H., Kovars, B., Daley, F., & Allin, N. (1972). *The new approach to music : Primary division*. Ontario: Winston Press.
- Regelski, T. A. (1982). Preserve the music in music theory. *Music Education Journal*, 68, 5, 40-41.
- Reigelvth, C. M (Ed). (1987). *Instructional theories in action: Lessons illustrating selected theories and models*. New Jersey: Lawrence Erlbaum.
- Schmidt, C. P., & Lewis, B. (1987). Field dependence/independence movement based instruction and 4th grade achievement in selected musical tasks. *Psychology of Music*, 15, 117-127.
- Seashore, C. E. (1967). *Psychology of music*. New York: Dover.
- Smith, R. D. (1983). The use of memory. *Journal of Philosophy of Education*, 17, 1, 85-95.

Sonnier, I. L. (1982). *Holistic education: Teaching of science in the affective domain*. New York: Philosophical Library.

Swanwick, K. (1984). Some observations on research and music education. *British Journal of Music Education*, 1, 3, 195-204.

Taylor, D. (1989). Physical movement and memory for music. *British Journal of Music Education*, 6, 3, 251-260.

APPENDICES

APPENDIX 1

The Four Songs

Song 1 - Cuckoo



Cuckoo, Cuckoo, Cuckoo, Cuckoo, Cuckoo,
I hear a little bird sing;
Cuckoo, Cuckoo, Cuckoo, Cuckoo, Cuckoo,
I hear a little bird sing.

Song 2 - No Room



No room! No room for the baby at Bethlem's inn.
Only a cattle shed, no where to lay his head;
In a manger a dry straw bed.

Song 3 - Little Bird



Little bird, Little bird you are welcome.
What's the news that you bring?
Little bird, Little bird, you are welcome.
Come and join us and sing.

Song 4 - Joseph/Mary



Joseph dearest, Joseph mild, help me rock my little child.
God will give you your reward in heaven above, in heaven above;
The Son of virgin Mary.

APPENDIX 2

Lesson Plans

Week 1

Lesson 1 - Cuckoo Song (Rote Method)

Words, Melody, Rhythms

Warm Up

5 - 10 minutes - Teacher's choice of song.

Sing Song to Class

Teach Words and Melody to Class

- Phrase 1 : teacher sings - students repeat twice
- Phrase 2 : teacher sings - students repeat twice
- Phrases 1 & 2 : students repeat twice
- Phrase 3 : teacher sings - students repeat twice
- Phrase 4 : teacher sings - students repeat twice
- Phrases 3 & 4 : students repeat twice
- Phrases 1 - 4 : students repeat three times (without teacher)

Learn Rhythms - clapping

- Phrase 1 : teacher claps rhythms and sings the phrase - students repeat twice
- Phrase 2 : teacher claps rhythms and sings the phrase - students repeat twice
- Phrases 1 & 2 : students clap rhythms and sing the phrases twice
- Phrase 3 : teacher claps rhythms and sings the phrase - students repeat twice
- Phrase 4 : teacher claps rhythms and sings the phrase - students repeat twice
- Phrases 3 & 4 : students clap rhythms and sing the phrases twice
- Phrases 1 - 4 : students repeat clapping and singing three times (without teacher)

Partner Games - one claps rhythm; other taps beat on partner's back.

- Phrase 1 : teacher demonstrates - students repeat twice
- Phrase 2 : teacher demonstrates - students repeat twice
- Phrases 1 & 2 : students repeat twice
- Phrase 3 : teacher demonstrates - students repeat twice
- Phrases 4 : teacher demonstrates - students repeat twice
- Phrases 3 & 4 : students repeat twice
- Phrases 1 - 4 : students repeat three times (without teacher)

Week 1

Lesson 2 - Little Bird (Whole Method)

Warm Up

5 - 10 minutes.

Same as Lesson 1 and for the same length of time.

Sing Song to Class

Teach Words and Melody to Class

Teacher sings the song through - the students are asked to join in after the first time.

Teacher and students sing together: 12 times

Students sing by themselves: 3 times

Total 15 times

Learn Rhythms - clapping

Teacher sings and claps the rhythms of the whole song - the students are asked to join in after the first time.

Teacher and students clap rhythms and sing together: 12 times

Students sing and clap rhythms without teacher: 3 times

Total 15 times

Partner Games

One claps rhythm; other taps beat on partner's back

Practise 15 times.

Week 2

Lesson 3 - Cuckoo Song (Role Method)

Solfa and Tempo

Warm Up

5 - 10 minutes - Teacher's choice of a song.

Class Sings Song Through Twice to Revise

Teach Solfa to the Class

- | | | |
|---------------|---|--|
| Phrase 1 | : | teacher sings phrase using names and hand signs - students repeat twice |
| Phrase 2 | : | teacher sings phrase - students repeat twice |
| Phrases 1 & 2 | : | students repeat the phrases twice using names and hand signs |
| Phrase 3 | : | teacher sings using names and hand signs - students repeat twice |
| Phrase 4 | : | teacher sings phrase using names and hand signs - students repeat twice |
| Phrases 3 & 4 | : | students repeat the phrases twice using names and hand signs |
| Phrases 1 - 4 | : | students repeat the song <u>three</u> times without teacher using names and hand signs |

Children are Chosen to Play the "Human Piano" for the Song.

- | | | |
|---------------|---|----------------|
| Phrase 1 | : | one student |
| Phrase 2 | : | one student |
| Phrase 3 | : | one student |
| Phrase 4 | : | one student |
| Phrases 1 - 4 | : | three students |

Students Play Elimination Games - Tempo

Teacher explains game - 3 items - clap, click, patchen. The teacher draws five crosses on the board - these represent the beat. At three points around the beat "circle", a circle, square or diamond is drawn around a cross. These represent the three actions - clapping, clicking and patchening. The children are to sing through the phrase of the song while the teacher points to the beats on the board. Whenever the teacher arrives at a cross with an action on it the children are to do that particular action. Any child who doesn't perform the action at the correct time is eliminated from the round.

Metronome speed 104

Phrase 1	:	children attempt once
Phrase 2	:	children attempt once
Phrases 1 & 2	:	children attempt once
Phrase 3	:	children attempt once
Phrase 4	:	children attempt once
Phrases 3 & 4	:	children attempt once
Phrases 1 - 4	:	children repeat three times non stop

Metronome speed 76

Phrase 1	:	children attempt once
Phrase 2	:	children attempt once
Phrases 1 & 2	:	children attempt once
Phrase 3	:	children attempt once
Phrase 4	:	children attempt once
Phrases 3 & 4	:	children attempt once
Phrases 1 - 4	:	children repeat three times non stop

Week 2

<i>Lesson 4 - Little Bird (Whole Method)</i>
--

Warm Up

5 - 10 minutes

Same as Lesson 3

Class Sing Song

Twice to revise

Teach Solfa to the Class

Teacher demonstrates whole song using names and hand signs

Children attempt to sing and do hand signs - 12 times

Children attempt song without teacher - 3 times

Children Play "Human Piano" - all through the song

Choose seven children to try it

Children Play Elimination Games - Tempo

Teacher explains game - three items; clap, click, patchen (same as Lesson 3)

Metronome speed 104

Attempt song 9 times through

- 6 times stopping between each attempt
- 3 times non stop

Metronome speed 76

Attempt song 9 times through

- 6 times stopping between each attempt
- 3 times non stop

Week 3

Lesson 5 - Revision

Warm Up

5 minutes - Revision of the song practised in previous warm up activities.

Revise Rhythms

Children sway or walk to beat and clap rhythms.

Cuckoo

Phrase 1	:	Teacher demonstrates - students repeat twice
Phrase 2	:	Teacher demonstrates - students repeat twice
Phrases 1 & 2	:	Students repeat twice
Phrase 3	:	Teacher demonstrates - students repeat twice
Phrase 4	:	Teacher demonstrates - students repeat twice
Phrases 3 & 4	:	Students repeat twice
Phrases 1 & 4	:	Students repeat three times

Little Bird

Teacher demonstrates the whole song once

- 12 times through with teacher
- 3 times without teacher

Revise Melody

Human Piano - children attempt to play the "piano" and sing the words but NOT the solfa.

Cuckoo

Phrase 1	:	1 child
Phrase 2	:	1 child
Phrase 3	:	1 child
Phrase 4	:	1 child
Phrases 1 & 4	:	3 children

Little Bird

7 children to play "piano" for whole song

Revise Tempo

Metronome speed 152 - elimination games (the same three items and rules as in Lessons 3 and 4)

Cuckoo

Phrase 1	:	once through
Phrase 2	:	once through
Phrases 1 & 2	:	once through
Phrase 3	:	once through
Phrase 4	:	once through
Phrases 3 & 4	:	once through
Phrases 1 - 4	:	three times through - non stop

Little Bird

- 9 times through whole song
- 6 times stopping and starting each time
- 3 times non stop

Words, Melody, Rhythms

Warm Up

5 - 10 minutes - Teacher's choice of a song

Sing Song to the Class

Teach Words and Melody to Class

Teacher sings the song through. The students are asked to join in after the first time.

Teacher and students sing together:	12 times
Students sing by themselves:	3 times
Total	15 times

Learn Rhythms - clapping

Teacher sings song and claps the rhythms.

The students are asked to join in after the first time.

Teacher and students sing and clap the rhythms together	12 times
Students sing and clap the rhythms by themselves	3 times
Total	15 times

Partner Games - clapping

One child claps the rhythm.

Other child taps the beat on partner's back.

Practise 15 times.

Words, Melody, Rhythms

Warm Up

5-10 minutes

Same as Lesson 1

Sing Song to Class

Teach Words and Melody to Class

- Phrase 1 : teacher sings twice (2), children repeat 5 times
- Phrase 2 : teacher sings twice (2); children repeat 5 times
- Phrases 1 & 2 : students sing 5 times
- Phrase 3 : teacher sings twice; children repeat 5 times
- Phrase 4 : teacher sings twice; children repeat 5 times
- Phrases 3 & 4 : students sing 5 times
- Phrases 1 - 4 : students sing 3 times without teacher

Teach Rhythms -clapping and singing

- Phrase 1 : teacher claps and sings twice; children repeat 5 times
- Phrase 2 : teacher claps and sings twice; children repeat 5 times
- Phrases 1 & 2 : students clap and sing 5 times
- Phrase 3 : teacher claps and sings twice; children repeat 5 times
- Phrase 4 : teacher claps and sings twice; children repeat 5 times
- Phrases 3 & 4 : students sing 5 times
- Phrases 1 - 4 : students clap and sing 3 times without teacher

Partner Games - One claps rhythm, other taps beat on partner's back.

- Phrase 1 : teacher demonstrates twice; children repeat 5 times
- Phrase 2 : teacher demonstrates twice; children repeat 5 times
- Phrases 1 & 2 : students repeat 5 times
- Phrase 3 : teacher demonstrates twice; children repeat 5 times
- Phrase 4 : teacher demonstrates twice; children repeat 5 times
- Phrases 3 & 4 : students repeat 5 times
- Phrases 1 - 4 : students repeat 3 times without teacher

Week 2 (2)

Lesson 3 - Joseph/Mary (Whole)

Solfa, Tempo

Warm Up

5-10 minutes - Teacher's choice of a song

Class Sings Song

Through twice to revise

Teach Solfa to the Class - Names and Hand Signs

Teacher demonstrates whole song using names and hand signs

Children attempt to sing and do hand signs - 12 times

Children attempt song without teacher - 3 times

Children Play Elimination Games - Tempo (same items and rules as Lesson 4 in Session 1)

Metronome 104 - attempt 7 times through - 4 stopping and starting between each attempt
3 non stop

Metronome 76 - attempt 7 times through - 4 stopping and starting between each attempt
3 non stop

Week 2 (2)

Lesson 4 - No Room (Rote)

Warm Up

5-10 minutes

Same as Lesson 3

Class Sing Song

Through twice to recap

Teach Solfa to the Class - Names and Hand Signs

- Phrase 1 : teacher demonstrates twice using names and hand signs;
children repeat 5 times
- Phrase 2 : teacher demonstrates twice using names and hand signs;
children repeat 5 times
- Phrases 1 & 2 : children sing 5 times using names and hand signs
- Phrase 3 : teacher demonstrates twice using names and hand signs;
children repeat 5 times
- Phrase 4 : teacher demonstrates twice using names and hand signs;
children repeat 5 times
- Phrases 3 & 4 : children sing 5 times using names and hand signs
- Phrases 1 - 4 : children sing 3 times without teacher using names and
hand signs

Children play "Human Piano"

- Phrase 1 : 2 children attempt
- Phrase 2 : 2 children attempt
- Phrase 3 : 2 children attempt
- Phrase 4 : 2 children attempt
- Phrases 1 - 4 : 2 children attempt

Children Play Elimination Games - Tempo (same items and rules as Lesson 3 in Session 1)

Metronome speed 104

Phrase 1	:	children attempt 2 times
Phrase 2	:	children attempt 2 times
Phrases 1 & 2	:	children attempt 2 times
Phrase 3	:	children attempt 2 times
Phrase 4	:	children attempt 2 times
Phrases 3 & 4	:	children attempt 2 times
Phrases 1 - 4	:	children attempt 3 times through non stop.

Repeat with Metronome speed 76

Warm Up

5 minutes - Revision of the song practised in previous warm up activities.

Revise Rhythms

Children sway/walk to beat and claps rhythms

Joseph/Mary

Teacher demonstrates.

- 12 times through with teacher
- 3 times without teacher

No Room

- | | | |
|---------------|---|---|
| Phrase 1 | : | teacher demonstrates twice; children repeat 5 times |
| Phrase 1 | : | teacher demonstrates twice; children repeat 5 times |
| Phrases 1 & 2 | : | children sing/clap 5 times |
| Phrase 3 | : | teacher demonstrates twice; children repeat 5 times |
| Phrases 4 | : | teacher demonstrates twice; children repeat 5 times |
| Phrases 3 & 4 | : | children sing/clap 5 times |
| Phrases 1 - 4 | : | children sing/clap 3 times without teacher |

Revise Melody

Human Piano - children attempt to play the "piano" and sing the words NOT the solfa.

Joseph/Mary

Choose 4 children

No Room

- | | | |
|---------------|---|--------------------|
| Phrase 1 | : | 2 children attempt |
| Phrase 2 | : | 2 children attempt |
| Phrase 3 | : | 2 children attempt |
| Phrase 4 | : | 2 children attempt |
| Phrases 1 - 4 | : | 2 children attempt |

Revise Tempo

Metronome speed 152 - elimination games (the same three items and rules as in Lessons 3 and 4)

Joseph/Mary

- 5 times through whole song
- 2 times stopping and starting between each attempt
- 3 times non stop through

No Room

- | | | |
|---------------|---|------------------------------|
| Phrase 1 | : | once through |
| Phrase 2 | : | once through |
| Phrase 1 & 2 | : | once through |
| Phrase 3 | : | once through |
| Phrase 4 | : | once through |
| Phrases 3 & 4 | : | once through |
| Phrases 1 - 4 | : | three times through non stop |

APPENDIX 3

Session 1

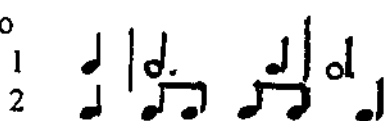
Test Questions

Words

- 1 Write all the words of the "Cuckoo" song.
- 2 Write all the words of the "Little Bird" song.

Rhythms - Write down the words that match the clapped rhythms you hear.

Cuckoo



Cuckoo, Cuckoo
I hear a little bird

Little Bird



You are welcome
Little bird, little bird

Intervals - Write down the words that match the solfa you hear sung to "Lah".

Cuckoo



I hear a little bird sing
Si-n-g

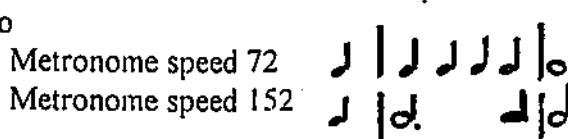
Little Bird



News that you bring
Little bird, little bird

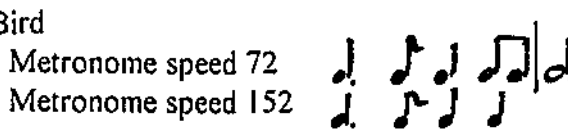
Tempo - Write down the words that match the parts of the song you hear sung to "Lah".

Cuckoo



Cuckoo Cuckoo Cuckoo
Cuckoo Cuckoo

Little Bird



Come and join us and sing
You are welcome

Words

- 1 Write all the words of the "Joseph/Mary" song.
- 2 Write all the words of the "No Room" song.

Rhythms - Write down the words that match the clapped rhythms you hear.**Joseph/Mary**

- 1 help me rock my
- 2 Son of Virgin Mary

No Room

- 1 Nowhere to lay his head in a
- 2 No Room

Intervals - Write down the words that match the solfa you hear sung to "Lah".**Joseph /Mary**

- 1 Little child
- 2 Joseph dearest Joseph mild

No Room

- 1 Only a cattle shed
- 2 No room for the

Tempo - Write down the words that match the parts of the song you hear sung to "Lah".**Joseph/Mary**

- Metronome speed 72 God will give you
- Metronome speed 152 Son of Virgin Mary

No Room

- Metronome speed 72 No room, no room
- Metronome speed 152 Manger a dry straw bed